

# Notice of Allowability

Application No.

10/782,811

Applicant(s)

BURKARD ET AL.

Examiner

Joseph P. Hirl

Art Unit

2129

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to July 2, 2007.
2. ☒ The allowed claim(s) is/are 1,5-13 and 15-22.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.


**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
JOSEPH P. HIRL  
PRIMARY EXAMINER  
BIOLOGY CENTER 2100

***Examiner's Amendment***

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

***In the Claims***

2. Change all claims in accordance with the following claim listing:

1. (Currently amended) A method of coupling a qubit, said method comprising:  
providing a transmission line for at least one of controlling said qubit and reading out a state of said qubit; and

locating said qubit near a transmission line approximately at a location corresponding to a node at a predetermined frequency, said predetermined frequency comprising a basic operating frequency F01 of said qubit as a frequency difference between a lowest energy state of said qubit and a second lowest energy state of said qubit.

2-4. (Canceled)

5. (Original) The method of claim 1, wherein said node is located at a  $1/4$  wavelength location away from an end of said at least one transmission line at said predetermined frequency.

6. (Original) The method of claim 1, wherein said node is generated by forming one of a shorted end on said at least one transmission line and an open end on said at least one transmission line.

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7. (Original) The method of claim 1, wherein said at least one transmission line comprises a superconducting material.
8. (Original) The method of claim 1, wherein said at least one transmission line comprises one of a coplanar stripline and a microstrip line.
9. (Original) The method of claim 1, wherein said qubit comprises a current-biased qubit and said node comprises a current node.
10. (Original) The method of claim 1, wherein said qubit comprises a voltage-biased qubit and said node comprises a voltage node.
11. (Original) The method of claim 1, wherein an input impedance of said transmission line approximately matches an output impedance of a circuit that provides said one of controlling said qubit and reading out a state of said qubit.
12. (Original) The method of claim 1, further comprising:  
adjusting a ratio of a size of said qubit to a length of said transmission line.
13. (Currently amended) A circuit comprising:  
a qubit having a basic operating frequency F01 being a frequency difference between a lowest energy state of said qubit and a second lowest energy state of said qubit; and  
at least one transmission line related to an operation of said qubit, wherein said qubit is located near said transmission line approximately at a node ~~in a control~~  
~~parameter of~~ defined relative to said basic operating frequency.

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14. (Canceled)

15. (Original) The circuit of claim 13, wherein said node is located at a  $1/4$  wavelength location away from an end of said at least one transmission line at said basic operating frequency.

16. (Original) The circuit of claim 13, wherein said node is generated by one of a shorted end on said at least one transmission line and an open end on said at least one transmission line.

17. (Original) The circuit of claim 13, wherein said at least one transmission line comprises a superconducting material.

18. (Original) The circuit of claim 13, wherein said at least one transmission line comprises one of a coplanar stripline and a microstrip line.

19. (Original) The circuit of claim 13, wherein said qubit comprises a current-biased qubit and said node comprises a current node.

20. (Original) The circuit of claim 13, wherein said qubit comprises a voltage-biased qubit and said node comprises a voltage node.

21. (Original) The circuit of claim 13, wherein an input impedance of said transmission line approximately matches an output impedance of a circuit that provides said one of controlling said qubit and reading out a state of said qubit.

22. (Original) The circuit of claim 13, further comprising:

one of a current source and a voltage source connected to said transmission line to provide one of a current and a voltage to bias said qubit.

23-27. (Canceled)

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3. Authorization for this examiner's amendment was given in a fax received on August 27, 2007 from applicant's attorney, Frederick E. Cooperrider.

***Correspondence Information***

4. Any inquiry concerning this information or related to the subject disclosure should be directed to the Primary Examiner, Joseph P. Hirl, whose telephone number is (571) 272-3685. The Examiner can be reached on Monday – Thursday from 5:30 a.m. to 4:00 p.m.

As detailed in MPEP 502.03, communications via Internet e-mail are at the discretion of the applicant. Without a written authorization by applicant recorded in the applicant's file, the USPTO will not respond via e-mail to any Internet correspondence which contains information subject to the confidentiality requirement as set forth in 35 U.S.C. 122. A paper copy of such correspondence will be placed in the appropriate patent application. The following is an example authorization which may be used by the applicant:

Notwithstanding the lack of security with Internet Communications, I hereby authorize the USPTO to communicate with me concerning any subject matter related to the instant application by e-mail. I understand that a copy of such communications related to formal submissions will be made of record in the applications file.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, David R. Vincent can be reached at (571) 272-3080.

Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

Hand delivered to:

Receptionist,

Customer Service Window,

Randolph Building,

401 Dulany Street,

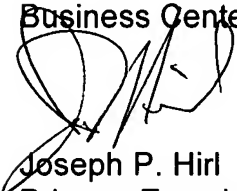
Alexandria, Virginia 22313,

(located on the first floor of the south side of the Randolph Building);

or faxed to:

(571) 273-8300 (for formal communications intended for entry.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have any questions on access to Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).



Joseph P. Hirl  
Primary Examiner  
August 29, 2007